AMENDMENTS TO THE CLAIMS

This listing of the claims replaces all prior versions, and listings of the claims in the application:

1. (Original) An auto-titration pressure support system comprising:

a pressure generating system adapted to generate a flow of breathing gas at a selectable pressure level and to change the pressure level from a base pressure during a respiratory cycle;

a patient circuit having a first end adapted to be coupled to the pressure generating system and a second end adapted to be coupled to an airway of a patient;

a monitoring system associated with the patient circuit or the pressure generating system and adapted to measure a parameter indicative of a pressure at a patient's airway, a flow of gas in such a patient's airway, or both and to output a pressure signal, a flow signal indicative thereof, respectively, or both; and

a controller coupled to the monitoring system and the pressure generating system, for controlling the base pressure of the pressure generating system based on the output of the monitoring system, wherein the controller is programmed to operate according to one control layer in a set of prioritized control layers, wherein each control layer in the set of prioritized control layers competes for control of the pressure generating system with the other control layers, and wherein each control layer implements a unique pressure control process for controlling the pressure of the flow of breathing gas output by the pressure generating system.

2. (Original) The system of claim 1, wherein each control layer in the set of prioritized control layer includes:

a detection module that receives the pressure signal, the flow signal, or both;

a monitoring module that monitors an output of the detection module to determine whether to request that the control layer take control of the pressure generating system; and

a control module that controls the operation of the pressure generating system responsive to the control layer being granted control thereof.

3. (Original) The system of claim 1, wherein the set of prioritized control layers include:

(a) flow limit control layer that monitors the flow signal to determine whether the pressure generating system is exhibiting a large leak indicative of the patient circuit not being connected to an airway of a patient, and causes the pressure generating system to lower the pressure of the flow of breathing gas responsive to detection of the large leak and maintains the pressure generating system at the lower pressure;

(b) snore control layer that monitors the flow signal, the pressure signal, or both for snoring, and causes the pressure generating system to increase the pressure of the flow of breathing gas responsive to detection of snore;

(c) a big leak control layer that monitors the flow signal to determine whether the pressure generating system is exhibiting a leak that is less than the large leak but great enough to cause the pressure support system to not operate reliably, and causes the pressure generating system to lower the pressure of the flow of breathing gas responsive to detection of the large leak for predetermined period of time;

(d) an apnea/hypopnea control layer that monitors the flow signal, the pressure signal, or both to determine whether the patient is experiencing an apnea, a hypopnea, or both, and causes the pressure generating system to adjust the pressure of the flow of breathing gas responsive to detection of apnea, hypopnea, or both;

(e) a variable breathing control layer that monitors the flow signal to determine whether the patient is experiencing erratic breathing, and causes the pressure generating system to adjust the pressure of the flow of breathing gas responsive to detection of erratic breathing; and

(f) an auto-CPAP control layer that controls the pressure of the flow of breathing gas responsive to proactively search for a pressure that optimizes the pressure provided to the patient to treat disordered breathing.

4. (Original) The system of claim 3, wherein:

(1) the flow limit control layer has a higher priority than the snore control layer, the big leak control layer, the apnea/hypopnea control layer, the variable breathing control layer, and the auto-CPAP control layer;

(2) the snore control layer has a higher priority than the big leak control layer, the apnea/hypopnea control layer, the variable breathing control layer, and the auto-CPAP control layer and has a lower priority than the flow limit control layer;

(3) the big leak control layer has a higher priority than the apnea/hypopnea control layer, the variable breathing control layer, and the auto-CPAP control layer and has a lower priority than the flow limit control layer and the snore control layer;

(4) the apnea/hypopnea control layer has a higher priority than the variable breathing control layer, and the auto-CPAP control layer and has a lower priority than the flow limit control layer, the snore control layer, and the big leak control layer; and

(5) the variable breathing control layer has a higher priority than the auto-CPAP control layer and has a lower priority than the flow limit control layer, the snore control layer, the big leak control layer, and the apnea/hypopnea control layer.

5. (Original) The system of claim 1, further comprising a manual input for controlling the operation of the pressure support system, and wherein the set of prioritized control layers include at least one first control layer that is initiated based on the manual input and at least one second control layer that is initiated based on the pressure signal, the flow signal or both, wherein the at least one first control layer has a higher priority than the at least one second control layer.

6. (Original) The system of claim 5, wherein the first control layer is a ramp control layer that causes the pressure generating system to gradually increase the pressure of the flow of breathing gas from a relatively low level to a target level responsive to receipt of a ramp activation signal as the manual input.

7. (Original) The system of claim 6, wherein the second control layer includes at least one of the following control layers:

(a) flow limit control layer that monitors the flow signal to determine whether the pressure generating system is exhibiting a large leak indicative of the patient circuit not being connected to an airway of a patient, and causes the pressure generating system to lower the pressure of the flow of breathing gas responsive to detection of the large leak and maintains the pressure generating system at the lower pressure;

(b) snore control layer that monitors the flow signal, the pressure signal, or both for snoring, and causes the pressure generating system to increase the pressure of the flow of breathing gas responsive to detection of snore;

(c) a big leak control layer that monitors the flow signal to determine whether the pressure generating system is exhibiting a leak that is less than the large leak but great enough to cause the pressure support system to not operate reliably, and causes the pressure generating system to lower the pressure of the flow of breathing gas responsive to detection of the large leak for predetermined period of time;

(d) an apnea/hypopnea control layer that monitors the flow signal, the pressure signal, or both to determine whether the patient is experiencing an apnea, a hypopnea, or both, and causes the pressure generating system to adjust the pressure of the flow of breathing gas responsive to detection of apnea, hypopnea, or both;

(e) a variable breathing control layer that monitors the flow signal to determine whether the patient is experiencing erratic breathing, and causes the pressure generating system to adjust the pressure of the flow of breathing gas responsive to detection of erratic breathing; and

(f) an auto-CPAP control layer that controls the pressure of the flow of breathing gas responsive to actively search for a pressure that optimizes the pressure provided to the patient to treat disordered breathing.

Claims 8-21. (Cancelled).

22. (Currently Amended) An auto-titration pressure support system comprising:

a pressure generating system adapted to generate a flow of breathing gas at a selectable pressure level and to change the pressure level from a base pressure during a respiratory cycle;

a patient circuit having a first end adapted to be coupled to the pressure generating system and a second end adapted to be coupled to an airway of a patient;

a monitoring system associated with the patient circuit or the pressure generating system and adapted to measure a parameter indicative of a flow of gas in such a patient's airway and to output a flow signal indicative thereof; and

a controller coupled to the monitoring system and the pressure generating system, for controlling the base pressure based on the output of the monitoring system, wherein the controller determines a skewness of a patient's inspiratory waveforms from the output of the monitoring system and controls the pressure generating system according to the skewness determination, and wherein the controller determines the skewness of the inspiratory waveform by segmenting the inspiratory waveform into a first region that corresponds to a beginning portion of the inspiratory waveform and a second region that corresponds to a middle portion of the inspiratory waveform, and comparing the flow in the second region to the flow in the first region.

Claim 23. (Cancelled).

24. (Currently Amended) The system of claim ~~23~~22, wherein the flow in the first region corresponds to an average of the highest rates of flow in the first region, and wherein the flow in the second region corresponds to an average of the highest rates of flow in the second region.

25. (Currently Amended) The system of claim ~~23~~22, wherein the first region corresponds to approximately a first third of the inspiratory waveform and the second region corresponds to approximately a second third of the inspiratory waveform, and wherein the highest flow rates in the first region and the second region are defined as the flow rates within 5% of the highest flow rates in each region.

26. (Currently Amended) The system of claim ~~23~~22, wherein the skewness is calculated as a skewness number follows:

$$\text{skewness number} = \frac{\text{Average of the highest flow rates in the second region}}{\text{Average of the highest flow rates in the first region}}.$$

Claims 27-31. (Cancelled).

32. (Original) An auto-titration pressure support system comprising:

a pressure generating system adapted to generate a flow of breathing gas at a selectable pressure level and to change the pressure level from a base pressure during a respiratory cycle;

a patient circuit having a first end adapted to be coupled to the pressure generating system and a second end adapted to be coupled to an airway of a patient;

a monitoring system associated with the patient circuit or the pressure generating system and adapted to measure a parameter indicative of a pressure at a patient's airway, a flow of gas in such a patient's airway, or both and to output a pressure signal, a flow signal indicative thereof, respectively, or both; and

a controller coupled to the monitoring system and the pressure generating system, for controlling the pressure generating system based on the output of the monitoring system, wherein the controller is programmed to:

(1) determine whether the patient is experiencing an apnea/hypopnea based on the pressure signal or the flow signal,

(2) set a pressure treatment limit based on a pressure at a time an apnea/hypopnea is detected,

(3) cause the pressure generating system to increase the base pressure responsive to a current pressure being below the pressure treatment limit, and

(4) cause the pressure generating system to decrease the base pressure responsive to a current pressure being at or above the pressure treatment limit.

Claim 33. (Cancelled).

34. (Previously Presented) An auto-titration pressure support system comprising:

a pressure generating system adapted to generate a flow of breathing gas at a selectable pressure level and to change the pressure level from a base pressure during a respiratory cycle;

a patient circuit having a first end adapted to be coupled to the pressure generating system and a second end adapted to be coupled to an airway of a patient;

a monitoring system associated with the patient circuit or the pressure generating system and adapted to measure a parameter indicative of a flow of gas in such a patient's airway and to output a flow signal indicative thereof; and

a controller coupled to the monitoring system and the pressure generating system, for controlling the pressure generating system based on the output of the monitoring system, wherein the controller is programmed determine whether the patient is experiencing a central apnea/hypopnea or an obstructive/restrictive apnea/hypopnea by monitoring one or more of the following: (1) at least one shape parameter associated with the flow of gas during an

apnea/hypopnea period, and (2) a characteristic of the flow of gas at the end of the apnea/hypopnea period indicative of an increase in respiratory effort, wherein the shape parameters monitored by the controller during an apnea/hypopnea period includes a flatness of an inspiratory portion of a flow waveform, a roundness of the inspiratory portion of the flow waveform, a skewness of the inspiratory portion of the flow waveform, and wherein the controller considers a patient to be experiencing an obstructive/restrictive apnea/hypopnea responsive to the inspiratory portion of the flow waveform exhibiting at least one of an increase in flatness, a decrease in roundness, and an increased skewness, otherwise the controller considers the patient to be experiencing a central apnea/hypopnea, and wherein the controller prevents a pressure increase by the pressure generating system responsive to a determination that the patient is experiencing a central apnea/hypopnea.